MARTINDALE

Electrical Test Equipment

- Ammeters
- Bar to Bar Testers
- Brush Tension Scales
- Coil Testers
- Megohm Testers
- Motor Rotation/Phase Sequence Indicators
- Temperature Testers
- Tachometers
- Voltage Testers

ELECTRICAL APPARATUS SERVICE ASSOCIATION
EASA
Reliable Solutions Today!

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01/06

MARTINDALE

Over 95 Years of Service.

Martindale Electric Co. started in the electric motor maintenance tool manufacturing business in 1913. From the start, we put emphasis on quality materials and workmanship — and on dedicated customer service.

Martindale specializes in the manufacture of equipment and supplies for the electric motor repairman. This section of our catalog describes our complete line of Electrical Test Equipment, as used by Motor Repair Technicians. The products on the following pages are the result of continuous field experience and research in an effort to help industry minimize the costs of maintaining electric motors and generators.

Martindale's years of experience, along with the latest technology, provides you the highest quality products demanded by the industry. Martindale is staffed to help you with your most challenging applications.

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Digital Multimeter

True RMS with backlit display

Features:

➠ Measurement functions include AC/DC Voltage and Current, Resistance, Capacitance, Frequency, Temperature & AC Bandwidth

➠ Relative, Min/Max, Peak Hold & Zoom

➠ Smart Auto Power Off

➠ Complete with Built-In Stand, Test Leads, Protective Holster, 9V Battery, & Bead Wire Temperature Probe

Ranges:
AC/DC Voltage: .01 mV to 1,000 V
AC/DC Current: .01 µA to 20 A
Resistance (Ω): .01 to 50 M
Capacitance: 0.01 nF to 9999 µF
Frequency: 10 Hz to 125 kHz
Temperature: -58° to 1,832° F
-50 C to 1,000 C
AC Bandwidth: 40 Hz to 20 kHz
CAT IV-600V
CE/UL Listed

	Catalog Number
Digital Multimeter	VAOTMP530

Net Weight 0.75 Lb. (340g), Shipping Weight 2 Lbs.

Dimensions:
7.32" x 3.42" x 1.39"
(186 x 87 x 35.5 mm)

V.A.O. Testers

Simpson Models 260-8 and 260-8P

Features:

➠ **Model 260-8** — world famous; offers movement overload protection, input protection, increased stability, and self-shielded meter movement.

➠ **Model 260-8P** — is identical to Model 260-8, but with built-in meter and tester protection approaching 100% which makes this instrument virtually GOOF-PROOF. A reset button pops out indicating overload. Circuits cannot be reset while the overload is present. This is especially important for inexperienced operators.

Mirrored Scale

UL Listed

Dimensions:
5-1/4" x 7" x 3-1/8"

Ranges:
Volts, D.C.: 0-0.250, 1, 2.5, 10, 50, 250, 500, 1000.
Volts, A.C.: 0-2.5, 10, 25, 50, 250, 500, 1000.
Amperes, D.C.: 0-10 (250 MV Drop).
Amperes, A.C.: up to 250 amperes in 6 ranges with Model 150-2 Amp-Clamp.
Milliamperes, D.C. only: 0-1, 10, 100, 500.
Ohms: Rx1 0-2000 (12Ω center)
Rx100 0-200,000 (1,200Ω center)
Rx10,000 0-20 megohms (120,000Ω center)
dB Scale, (IMW 600 ohms) - 20 to + 10, - 8 to + 22, + 6 to + 36, + 20 to + 50.

	Catalog Number
Model 260-8 complete with leads	VAOT2608
Model 260-8P complete with leads	VAOT2608P

Net Weight 3-1/2 Lbs., Shipping Weight 5 Lbs.

Carrying Case for either of above	VAOT260C

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AC DIGITAL CLAMP-ON MULTIMETER

True RMS 1,000A

Features:

- Include Power, Current Insulation Resistance & Temperature
- Min/Max & Data Hold
- Auto Off & Disable
- True Power, Apparent Power and Reactive Power, plus Horsepower, Power Factor, and Phase Angle with Lead/Lag Indicator
- Complete with Test Leads, Type K Probe -58° to 482° F / -50° C to 250° C, Case & 9V Battery

Ranges:
AC/DC Voltage: 600 V
AC Current: 1,000 A
Resistance (Ω): 100 M
Capacitance: 7,000 µF
Frequency: 1 kHz
Temperature: -58° to 1,000° F
-50 C to 900 C
CAT III-600V
CE/UL Listed

Dimensions:
9" x 3" x 1.6"
(228 x 76 x 39 mm)

Catalog Number
AC Digital Clamp-On Multimeter VAOT380976
Net Weight 16.4 oz. (465g), Shipping Weight 4 Lbs.

AC/DC DIGITAL CLAMP-ON MULTIMETER

True RMS 2,000A

Dimensions:
10" x 2.9" x 1.5"
(255 x 73 x 38 mm)

Features:

- Full Range Multimeter Functions with High Resolution to 0.1 µA/0.1mV
- Data Hold & Push Button Zero Adjust Improves DC Accuracy
- AC/DC Current Via Clamp with 0.1A Resolution
- Complete with Test Leads, Built-In Stand & 9V Battery

Ranges:
AC/DC Voltage: 1,000 V
AC/DC Current: 2,000 A
Resistance (Ω): 40 M
Capacitance: 50 µF
Frequency: 100 kHz
CAT III-1,000V
CE/UL Listed

Catalog Number
AC/DC Digital Clamp-On Multimeter VAOT380926
Net Weight 14 oz. (465g), Shipping Weight 3 Lbs.

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Megohm ProbeMeter™

Applications:
Portability lends itself well to field service personnel with many resistance measurement uses.
Ideal for acceptance testing and preventative maintenance of cables, wire harnesses, and motors.

Ranges:

	Range	Resolution	Accuracy (%rdg+digits)
Insulation Resistance:	20MΩ	0.01MΩ	±(2% + 2d)
	2000MΩ	1MΩ	<500MΩ ±(4% + 2d) >500MΩ ±(5% + 2d)
Insulation Test Voltage:	1000V		
Power Source:	Four 1.5V AAA batteries; External Jack; 200hr battery life		

Features:
- **1000 V. Test Voltage**
- **Two Ranges: 20 Megohm & 2000 Megohm, with 2 % basic accuracy.**
- **Auto Hold and Auto Power Off**
- **Large 3-1/2 Digit (1999 count) multifunction backlit LCD Display.**

Dimensions:
7" x 1.7" x 1.6"
(17.8 x 4.3 x 4 mm)

Megohm ProbeMeter complete with carrying case and 4 AAA batteries . . . . . Catalog Number MEGT403360
Net Weight with accessories and case 10 ozs., Shipping Weight 2 Lbs.

Insulation Tester/Megohmmeter

Features:
- **Power Lock for 3 minute Test**
- **Overload Protection**
- **Large 0.65" LCD Display**

Ranges:
2000 Megohms @ 1000 VDC
200 Megohms @ 500 VDC
200 Megohms @ 250 VDC
200 Ohms
600 Volts

Power Lock for 3 minute Test

Overload Protection

Dimensions:
6" x 4" x 2-1/2"
15.2 x 10.2 x 6.4 cm

Catalog Number
Insulation Tester/Megohmmeter with 6 - AA Batteries, test leads and case INST380360
Net Weight 2 Lbs., Shipping Weight 3 Lbs.

Major Megger® Insulation and Continuity Tester

The rugged taut-band movement and all electronic circuitry assure maximum accuracy, reliability and durability.

Powered by an easy to crank, brushless D.C. generator driving solid state circuitry, this field model is always ready for use with no dependence on batteries or line power.

This unit is housed in an impact resistant poly carbonate case with a carrying handle which folds flush into the case.

Readings are shown directly on an analog meter with a large, clear white-on-black scale.

Ranges:
0 to 2000 Megohms @ DC Test Voltages: 100V, 250V, 500V, & 1000V
Resistance: 0-5000 Ohms

Dimensions:
7" x 6" x 5"
17.78 x 15.24 x 12.7 cm

Catalog Number
Model 212159 Major Megger Insulation and Continuity Tester with 6 ft. leads and carrying case MEGT212159
Net Weight 2-1/2 Lbs., Shipping Weight 6 Lbs.

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AC - High Voltage Insulation Testers

High voltage insulation testers indicate breakdowns, grounds, and shorts. Use them to apply a high-voltage test at various steps in the manufacture or repair of electrical products. This permits early detection of insulation weakness or failure that might otherwise show up only in the actual use.

These testers are built with a breakdown light which also serves as an "on" light. This indicating light dims or goes out completely to indicate a problem.

In addition, 4 models have a built-in safety switch that immediately stops current flow in the event of a breakdown. Along with the visual indication of a problem these units also have a buzzer which signals a problem. These units will shut down in the event of a breakdown and will not start up again until the start/reset button is reset.

All units are supplied with self retracting probed test leads. The probes are spring loaded and housed within the insulated fibre handles. The fibre slide buttons are pressed to expose the test probes. This safety feature minimizes the chance of accidental contact with the probes.

Ranges:
Five Test Voltages: 500, 1080, 1250, 1750, 2000 and 2500V

Model	115 V.	230 V.	Output Meter	Automatic Shutdown	Catalog Number
2109	√			√	INST2109A
2110	√				INST2110A
2119	√		√	√	INST2119A
2120	√		√		INST2120A
2129		√		√	INST2129B
2130		√			INST2130B
2139		√	√	√	INST2139B
2140		√	√		INST2140B

Net Weight 18 Lbs., Shipping Weight 20 Lbs.

5000V DC Hipot

Ranges:

Input Voltage:	115/230V selectable
Output:	Rating: DC 0 - 5000V, 3 mA
Voltage Setting:	0V - 5kV, 10 volts/step
Ripple:	< 5% at 5KVDC / 3 mA
Dwell Time: Setting:	0, 1 or 60 "0" for continuous running
Ramp Timer:	0 and 0.2 - 999.9 seconds, 0.1 second / step 0 ramp setting = 0.1 seconds fixed ramp
Failure Settings:	High Limit: 0.02 - 3.00 mA, 0.01 mA / Step Accuracy: ± (2% of setting + 0.02 mA)
Voltmeter (4 digits):	Range: DC 0.00 - 5.00 KV Accuracy: ± (2% of reading + 10 V)
Ammeter (4 digits):	Range: DC 0.00 - 3.00 mA Accuracy: ± (2% of reading + 0.02 mA)
Timer Display:	Range: 0.0 - 999.9 seconds
Dimensions:	4-3/4" x 5-3/4" x 14-1/2" 12 x 14.6 x 36.8 cm

Features:

➠ This model meets the UL, CSA, VDE, IEC, and UL 120K Ohm test requirement. This unit feature audible and visual failure alarms, and shut off high voltage upon reject.

➠ Operators can set output voltages and trip currents to desired levels in the absence of any high voltage, a key safety feature that conventional analog hipot testers lack.

➠ Easy-to-read digital display simplifies the task of setting test parameters and interpreting test results. Meter memory allows operators to review the last test results.

Model 2503, with Safety Probe with 6 ft. lead, Ground Return Clip with 6 ft. lead, and High Voltage Clip with 6 ft. lead . . . . . Catalog Number .MEGT2503
Net Weight: 16 Lbs., Shipping Weight: 18 Lbs.

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Phase and Motor Rotation Test Set (Biddle Instruments)

This Test Set provides a positive way to identify the leads of a disconnected polyphase motor, and also identify true phase sequence of energized 60 cycle a.c. power lines up to 600 Volts. Both are necessary to insure that a motor will rotate in a prescribed direction when energized.

The Test Set permits the electrician to permanently connect and tape the terminals of the motor being installed, without having to first energize the motor by a temporary hook-up to determine motor rotation. These temporary connections are time consuming and costly, and can be quite hazardous.

Two other important uses for the Test Set: it can determine the polarity of power and instrument transformers, and it can be used as a continuity tester in checking electrical circuits.

High Impact Plastic Case has deep removable lid (not shown) to store leads and instruction manual.

Input:
50/60 Hz. up to 600 Volts

Also uses "D" cell

Dimensions, with case:
8" x 7-1/2" x 7-1/2"

Catalog Number

Phase and Motor Rotation Test Set PHSI56
Net Weight 3-1/2 Lbs., Shipping Weight 6 Lbs.

Motor Rotation & 3-Phase Tester

Motor rotation tester for measuring the rotation direction of motor shafts. Ensures motor is not damaged from incorrect wiring.

Testing phase orientation of three phase power sources ranging from 100 to 600 VAC.

Frequency Range over 50 to 70 Hz.

Five LED's indicate phase orientation (clockwise or counter-clockwise); and whether each of three phases is live.

Complete with three large alligator clips.

Dimensions: 6" x 3-1/3" x 1-1/2"

Catalog Number

Motor Rotation & 3-Phase Tester PHSI480403
Net Weight 14 ozs., Shipping Weight 2 Lbs.
Vinyl Pouch Carrying Case PHSI409996

All-Test PRO™ 31

Motor Coil & Winding Tester
Goes Far Beyond Ordinary Megohm-Meters

Tests:

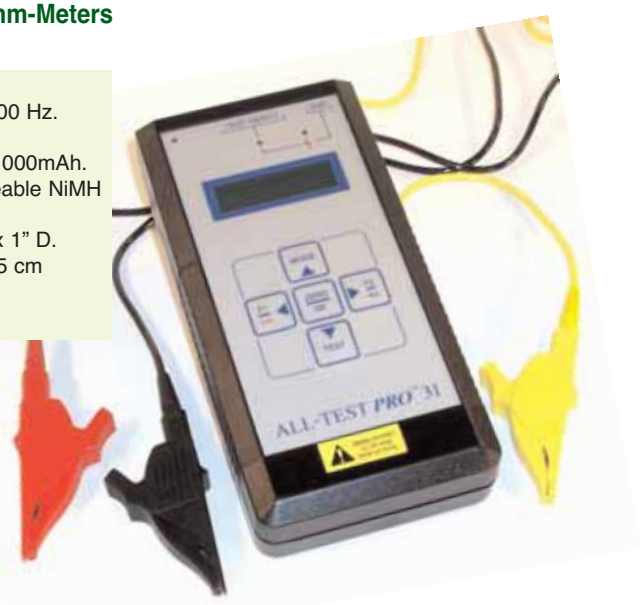
- **Turn-to-Turn Faults**
- **Internal Faults**
  - **Turn to Turn**
  - **Coil to Coil**
  - **Phase Balance**
- **Broken Rotor Bars & Casting Voids**
- **Grounded, Open, Contaminated Windings**
- **Shorted Armature Windings (DC Motors)**
- **Capacitor Failues**

Testing Frequencies Used:
25, 50, 60, 100, 200, 400 & 800 Hz.

Batteries: 6 to a pack, 1.2V-1000mAh. Rechargeable NiMH

Dimensions: 7.5" L. x 4" W. x 1" D.
19 x 10.2 x 2.5 cm

CE Listed



Catalog Number

All-Test PRO™ 31 Complete with Batteries,
Test Leads, 115V or 230V Charger (Specify Which),
Manual on CD Rom, Carrying Pouch & Reset . . . . . .COTE31(A) or (B)
Net Weight 1 Lb. (454g), Shipping Weight 3 Lbs. (1,361g)

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Model 101 Bar to Bar Tester

State Of The Art — Easy To Use — Eliminates Guesswork

This meter will check any armature that has enough resistance to move the meter needle into the green or "OK" section of the meter face during the initial "zeroing-in". On a large armature which has very little resistance, the meter needle will show less deflection but enough to establish a starting point.

"Dead shorts" are detected by a reading on that portion of the meter and even partial shorts can be detected by a deflection from the "zeroing-in" point that the test was started from.

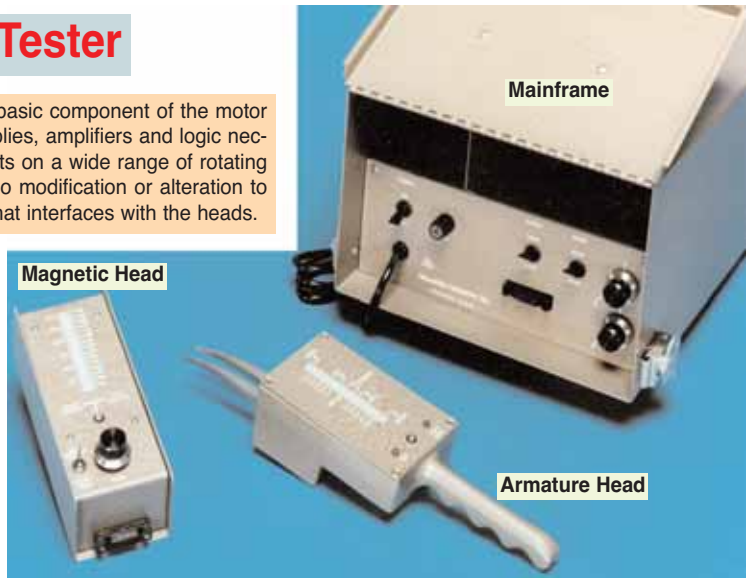
The color coded meter face also has indications for open and reversed coils.

- One meter/One setting indicates circuit OK, shorted, open, or reversed
- Eliminates guesswork — zeroes right in on problem circuit
- Never again strip a good armature only to find equalizers caused a short to be indicated
- Sensitive enough to identify unsatisfactory circuits that other testers cannot find
- Pays for itself by eliminating unnecessary repairs or expensive second teardowns
- A quality buy, this highly scientific and advanced test equipment will maintain or increase in value

Catalog Number
Model 101 Bar to Bar Tester INST101
Net Weight 2 Lbs., Shipping Weight 3 Lbs.

Model MAS Bar to Bar Tester

The ***Model MAS*** Mainframe is a self contained unit that forms the basic component of the motor Analysis System. The Mainframe contains the necessary power supplies, amplifiers and logic necessary to drive the various heads and probes allowing numerous tests on a wide range of rotating equipment. Auxiliary heads may be added at any time and require no modification or alteration to the Mainframe. The Mainframe comes complete with a 7 foot cable that interfaces with the heads.



The ***Armature Head*** performs a four point AC variable frequency test on DC armatures. The Armature Head in conjunction with the Mainframe automatically selects one of four thousand different frequencies and power levels to match the armature being tested. The automatic feature makes this head fast to set up and easy to use. This permits accurate and repeatable analysis of most common armature problems such as shorts, opens, crossed connections, partial opens or shorts and misconnects. Armatures with equalizers and uneven turns are also easily tested. These features make this Bar to Bar Tester affordable and practical.

The ***Field Coil & Neutral Plane Test Head*** allows testing of series fields, interpoles and shunt fields. When used with the flux probe it is possible to test most coils in the machine without breaking the individual coil connections or isolating the coils from one another. The test quickly identifies coil polarity. The probe measures the impulse magnetic field flux generated by each coil allowing a relative comparison between coils. Shorted turns are indicated as a reduction in flux generated by a coil. This head allows easy and precise setting of neutral plane.

Since this head supplies all impulse power to the fields being tested, there is no need to connect the motor to a test panel or any other power source.

This head comes with the Flux Probe and all necessary cables.

Specifications:

Main Frame:
- 120 V or 220 V
- Size: 10-1/2 x 7-1/2 x 15"
- Weight: 26 lbs. net

Armature Head:
- Power supplied by Main Frame
- Test Frequency: 100hz 5khz
- Max. Current Output: 2.5 amps true rms
- Readout: 30 segment solid state bar graph

Field Coil & Neutral Plane Test Head:
- Power supplied by Main Frame
- Output: Unipolar pulse
- Output Current: 40amps (short circuit)
- Pulse Width: 6ms and .5sec
- Repetition Rate: 10hz and 1.5hz switch selectable
- Readout: 30 segment bar graph

Catalog Number
Model MAS Bar to Bar Tester, 115 V. . . .INSTMAS
Model MAS Bar to Bar Tester, 230 V. . .INSTMASB
Net Weight 28 Lbs., Shipping Weight 33 Lbs.

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Martindale Growlers

General Information

When an alternating current is passed through a Growler, it sets up a magnetic flux in the iron of the armature or stator spanned by the jaws of the Growler.

As this flux passes through any coil, it induces a potential. A current will flow if the coil is short-circuited. When current flows, it sets up a magnetic field around the shorted coil which can be detected with an iron feeler. (The increased load on the Growler sometimes changes the tone of the hum; hence the name "Growler".).

Open coils can also be found; see discussion below.

Model B-1 has Adjustable Jaws with Face Length of 2-1/2".

At Left: Type B-1 Adjustable Bench Growler

Type B-1 has adjustable jaws 2-1/2" long. Armature capacity: 1" to18" diameter. There are no obstructions at the ends of the jaws, thus allowing small armatures with fans, bearings, etc., to fit properly.

Type U-2 Universal Adjustable Growler may be used as both an external Growler for armatures and an Internal Growler for stators.

Adjustable Jaws. Face Length 4".

Type U-2 Growler has adjustable jaws 4" long, and may be used on armatures over 1", and on stators over 5-3/4" inside diameter.

Foot-Switch

A Foot-Switch with an 8 ft. line cord, and a female connection is available for use with any of the Growlers. Large armatures cannot be easily rotated without shutting off the Growler current. This is conveniently done with the Foot-Switch, while the hands are left free to turn the armature.

Type F and I-X Growler

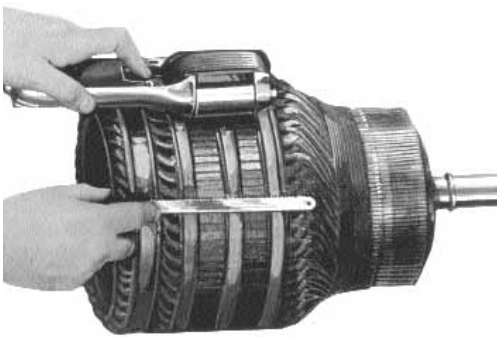
Type F and Type I-X both have built-in feeler. Type F has fixed position feeler, Type I-X feeler is adjustable.

Types F and I-X are similar in appearance, with built-in feeler as pictured, except the feeler on Model I-X is adjustable, which gives it a wider range of applications. Both have fixed jaws 2" long, and a thumb-switch.

Both can be used in stators as small as 2-3/8" inside diameter, and on armatures from 2-1/2" diameter up. The built-in feeler makes testing a one-hand operation, and is especially desirable in small stators where there isn't room for a separate feeler. The adjustable feeler on the I-X is more satisfactory where a variety of large and small armatures and stators are involved.

How Growlers Are Used

The most common way of using a Growler is the "feeler method" in which the Growler spans a slot containing a coil, and a "feeler" of iron, such as a hack-saw blade is held about 1/4" above the slot containing the other side of the same coil.



If the coil is shorted the feeler will be pulled down to the slot and will stick and vibrate. The action is very positive and is recognized instantly.

The feeler can also be used on the same side of the coil that is spanned by the Growler, either a separate feeler or the convenient built-in feeler of Types F and I-X.

Open Circuits

Open circuits can be detected by shorting adjacent commutator bars with a screw driver, or any other piece of metal. Good coils will spark as the bars are shorted. No sparks indicate the coil is open. Test field coils by shorting lead wires. Another way is to use a continuity tester such as the ones shown in our catalog.

Grounds can also be detected with a continuity tester.

Specifications

Type	Length Face	Range for Armatures, Diameter	Range for Stators Diameter	Weight — Lbs. Net	Weight — Lbs. Ship	Catalog Number 115 V. 50/60 Hz.	Catalog Number 230 V. 50/60 Hz.
U-2	4"	1" & up	5-3/4" & up	18-3/4	20	GRLRU2A	GRLRU2B
B-1	2-1/2"	1" - 18"	—	11-1/4	12-1/2	GRLRB1A	GRLRB1B
F	2"	2-1/2"-12"	2-3/8"-12"	3-1/2	5-1/2	GRLRFA	GRLRFB
I-X	2"	2-1/2"-12"	2-3/8"-12"	3-1/2	5-1/2	GRLRIXA	GRLRIXB
Foot Switch		—	—	2-1/2	3-1/2	JGRLFSA	GRLR19

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Martindale Hand Tachometers

Digital Photo/Contact Tachometer

The Model 461895 can be used two different ways, either as a direct contact style tach or a non-contact photo tach, depending on the type of work being performed or the preference of the operator.

The 5 digit LCD display gives exact RPM readings and eliminates the need to use a multiplying factor or calculate readings while watching an indicator needle fluctuate.

The Memory Recall feature allows recall of the last value recorded from the memory storage.

Accessories include two rubber tips, one surface speed test wheel, and two ft. of reflecting tape. Uses 4 x 1.5 V. AA batteries.

Range:
- ĺ5.0 to 99,999 RPM (Photo Mode)
- ĺ0.5 to 19,999 RPM (Contact Mode)
- ĺ0.2 to 6,560 ft./min.
- ĺ0.05 to 1,999 m./min.

Accuracy: ±(0.05$_7$ + 1 digit)

	Catalog Number
Model 461895 Tachometer with accessories and case	TACH461895

Net Weight with accessories & case 1 Lb. 10 oz., Shipping Weight 3 Lbs.

Dual Function Digital Tachometer

The Model 1726 Hand-Held Digital Tachometer is a dual function instrument providing contact and non-contact measurement of rotational and linear motions. With an accuracy of .025% of indicated reading 1 LSD, this unit is ideal for use in production, engineering, inspection, and maintenance.

This unit offers sixteen different functions of measurement from 6 - 99,999 RPM to .033 - 53 F/S, plus 14 more ranges.

Features:
- Contact or Non-Contact Measurement
- 8 Character Display
- 16 Units of Measure
- Unit of Measure Always Displayed
- Power Source 9V Battery
- Memory
- 3 Accessory Tips Included
- Case Included

	Catalog Number
Model 1726 Tachometer with accessories and case	TACH1726

Net Weight with accessories & case 1 Lb. 10 oz., Shipping Weight 3 Lbs.

Digital Stroboscope/Tachometer

Freeze motion and measure speed without contact

Checks and analyzes motion and speed by simply aiming and synchronizing its flash rate (fpm) with a rotating object. Read RPMS on 4 digit LED display. Duty cycles from 5 to 30 minutes. High accuracy over a wide, dynamic range via exclusive microcomputer LSI circuit and crystal control time-base.

Ideal for measuring the speed of moving gears, fans, pumps, motors and other equipment used in general maintenance, production, quality control or laboratories.

Complete with 6 ft. power cord, handle and can be tripod mounted.

Specifications:

Flash/Speed Rate:	100 to 10,000 fpm/rpm
Accuracy:	± (0.05% rdg + 1d)
Dimensions:	8.3 x 4.8 x 4.8”

	Catalog Number
Digital Strobo Tach, 115 V. AC, 60 Hz.	TACH461830
Digital Strobo Tach, 220 V. AC, 50 Hz.	TACH461831

Net Weight 2.2 Lbs., Shipping Weight 4 Lbs.

Spare Xenon Lamp (est. life 300 hrs.)	TACH461834

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Phone (216) 521-8567 • Fax Local 521-9476 / USA & Canada (800) 344-9191
E-Mail: sales@martindaleco.com
Web Site: www.martindaleco.com

Surface Temperature Tester

Calibrated Fahrenheit

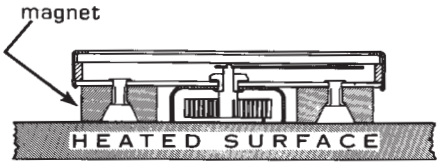
Accuracy is ± 2% of full scale

Built-in magnets hold tester to non-horizontal ferrous surfaces.

Model 312F is built for rough industrial use without any lessening of accuracy. The bimetallic sensor is a specialty processed alloy that is conditioned and tested for permanent calibration and maximum stability.

Recommended primarily for temperature measurement of electric motors and generators, bearings, etc., this tester can be used for checking any other surface within the range of 0° F to 250° F. Calibration is for use in an ambient temperature of about 70° F. Higher or lower surrounding air temperatures will result in slightly higher or lower readings. Three minutes should be allowed for the instrument to reach full stability when taking a reading.

The more nearly flat the surface being measured, the better contact will be made by the sensor. The magnets provide convenient temporary or permanent mounting to any ferrous surface, but the instrument is equally effective on non-ferrous horizontal surfaces. Dimensions: 2” diam. x 1/2” thick.



Catalog Number	
Model 312F (Fahrenheit)	TEMP312F

Net Weight 2 oz., Shipping Weight 6 oz.

High Temperature InfraRed Thermometer

Non Contact Mesurements
With Laser Pointer & 2000 Count Backlit LCD Display

- Automatic Data Hold
- Auto Power Off

Ranges:
-58° to 1400° F
-50° to 760° C

Accuracy:
+2%+2°<932° F (500° C)
+2.5%+5°>932° F (500° C)

Field of View:
12:1 Distance to Target Ratio
A 1” Square Target Area can be accurately read from a distance of 12 feet

Dimensions:
3.9” x 2.2” x 9” (100 x 56 x 230mm)

Catalog Number	
InfraRed Thermometer with 9V Battery	TEMP42540

Net Weight 10.2 oz. (290g), Shipping Weight 3 Lbs. (1,361g)

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Brush Tension Scale

For "Pull" Testing

Compact size for fast, easy readings.
Efficient, durable and small enough to fit in your hand, this Electronic Digital Scale is the convenient way to measure brush holder spring force. Simply attach the interchangeable strap or hook to the spring assembly and pull the scale taut by the comfort-grip handle. The measured force is clearly displayed in easy-to-read, 1/2" LCD numerals.

Precise Spring Force Measurements
The battery-operated Digital Scale accurately reads force measurements of both spiral torsion springs and constant force springs up to 15 lbs. (+ or - 2 oz.). Convenient automatic zeroing ensures measurement of only the spring force.

Spring Pressure Formula

$$\text{Spring Pressure (P.S.I.)} = \frac{\text{Measured Force (Lbs.)}}{\text{Brush Thickness (in.) X Brush Width (in.)}}$$

(For recommended spring pressures, contact your motor manufactuer.)

Catalog Number	
Brush Tension Scale, 15 lb. capacity	BRTSIN15EL

Net Weight 9 Ozs., Shipping Weight 2 Lbs.

Repairman's Stethoscope

This tool provides a low cost method of locating and identifying worn motor and equipment bearings and bushings, worn gears, and other trouble spots which can be traced by sound. The 2-piece probe reaches 11-3/4".

Catalog Number	
Repairman's Stethoscope	MARTRS

Net Weight 6 ozs., Shipping Weight 1 Lb.

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